

Studies of Spherical Co/ γ -Al₂O₃ Catalyst for Fischer-Tropsch Synthesis

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Fischer-Tropsch Synthesis (FTS) has been suggested as a key process of gas to liquids (GTL) technology for high-quality and environmentally friendly fuels. In the present work FTS carried out over spherical shaped γ -Al₂O₃ supported cobalt catalysts. The catalysts were prepared by conventional impregnation method with various cobalt loading (5-30 wt %) and characterized by N₂ physisorption, TPR, XRD, XPS and SEM/EDX techniques. The catalytic performance for FTS was investigated in a fixed-bed reactor with a H₂/CO molar ratio of 2, reaction temperature of 230 oC and reaction pressure of 20 bar. The activity and characterization results of Co/ γ -Al₂O₃ catalysts, suggested that the CO conversion depended on the micro structure of cobalt metallic phase and cobalt atomic surface density. It was also found that nano-sized cobalt particles both face centered cubic (FCC) and hexagonal close packed (HCP) forms may coexist in present catalysts, and HCP forms enhance the catalytic activity than FCC.